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# BULLETIN

## OF THE

# TORREY BOTANICAL CLUB

AUGUST, 1921

### Studies in the genus *Lupinus*—VI. The *Stiversiani*, *Concinni* and *Subcarnosus*

CHARLES PIPER SMITH  
(WITH EIGHT TEXT FIGURES)

#### INTRODUCTION

The three groups treated in this paper have little in common except that they are annuals or biennials with non-verticillate flowers. Each group is monospecific, as I see it, but botanists have seen as many as six species in the variable *L. concinnus* and four species in the likewise variable *L. subcarnosus*.

These groups may be contrasted as follows:

Racemes shorter than their peduncles; keel petals densely ciliate near the claw, on both upper and lower edges.	STIVERSIANI.
Racemes longer than their peduncles; keel petals naked on both upper and lower edges.	
Leaflets 2-5 mm. wide; pods 10-15 mm. long; seeds 1.5-3 mm. long.	CONCINNI.
Leaflets 6-12 mm. wide; pods 30-50 mm. long; seeds 4-6 mm. long.	SUBCARNOSI.

#### STIVERSIANI

1. *LUPINUS STIVERSI* Kellogg, Proc. Cal. Acad. I. 2: 192. 1892. [FIG. 67.]

Erect, the few to several branches ascending, 15-45 cm. tall, canescent; leaves scattered, appressed-pubescent on both sides, petioles 3-8 cm. long, leaflets six to seven, obovate to cuneate, obtuse at apex, 12-40 mm. long, 4-8 mm. wide; peduncles 3-8 cm. long, racemes 1-3 cm. long, few-flowered; flowers about 15 mm. long, pedicels about 2 mm. long, appressed-pubescent; calyx with or without bractlets, upper lip 4-6 mm. long, bifid, lower lip

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entire or minutely three-toothed, 5–8 mm. long; banner 13–15 mm. long, 9–10 mm. wide, bright yellow, wings 16 mm. long, rose-pink or purple, sometimes ciliate on the basal tooth, keel whitish, strongly ciliate toward the base both above and below, the lower fringe running out along the claw; pods about 20 mm. long, ovules five to seven; seeds about 2.5 x 2 mm., flat, angled, dark-spotted on a pale ground.

This very unique and handsome species belongs primarily to the western slopes of the Sierras, from Butte County to Kern County, but also occurs locally in the San Bernardino Mountains and in the Santa Lucia Mountains of Monterey County.

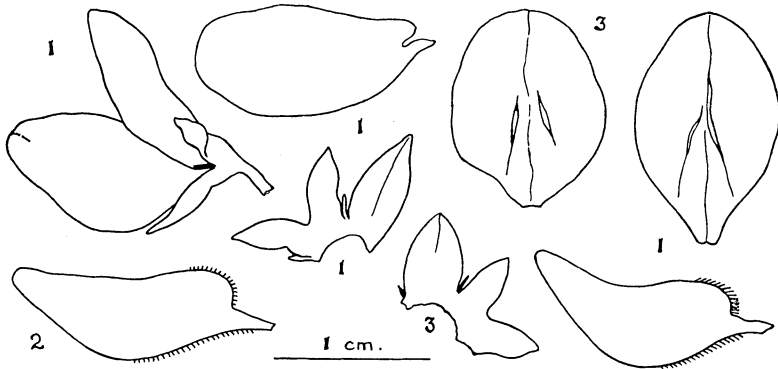


FIG. 67. *LUPINUS STIVERSI* Kellogg. 1. *J. W. Congdon* (US 466506); 2. *G. Hansen* 18 (US); 3. *A. D. E. Elmer* 3271 (US).

CALIFORNIA. Amador County: New York Falls, April, 1891, *G. Hansen* (DS); same locality, April, 1893, *G. Hansen* 18 (UC); same locality, May, 1895 (US). Butte County: Brush Creek, 1907, *Kate Conger* (UC); Nimshew, May, 1918, *Alethea Beagles & G. P. Van Eseltine* (CPS). El Dorado County: Pyramid Peak, 1900, *W. L. Atkinson* (DS); Tahoe road, fifteen miles above Placerville, May, 1907, *K. Brandegee* (UC); same locality, May, 1903, *C. A. Gross* 95 (DS). Fresno County: between Sauger and Sequoia Mills, May, 1894, *A. Eastwood* (G); Pine Ridge, June, 1900, *Hall & Chandler* 205 (DS, NY, UC, US). Kern County: Green Horn Mountains, June, 1888, *E. Palmer* 115 (T); Kernville, *T. S. Brandegee* (G). Madera County: North Fork and vicinity, May–June, 1903, *D. Griffith* 4457 (US); Shuteye Mountain, July, 1907, *J. Murdock, Jr.* 2514 (G). Mariposa County: Clarks, on branch of Merced River, 1872, *A. Gray* (G); same locality, June,

1881, *C. C. Parry* 39 (G); Culip, March, 1883, *J. W. Congdon* (NY); Mariposa, March, 1883, *J. W. Congdon* (US); same locality, May, 1903, *J. W. Congdon* (B); Morman Bar, May, 1892, *J. W. Congdon* (DS); Pea Ridge road, April, 1901, *J. W. Congdon* (US); same locality, May, 1902, and April, 1903, (B); Toll House road, May, 1903, *J. W. Congdon* (G); Wawona flats, July, 1919, *S. S. Towne & E. P. Chace* (CPS); Yosemite, 1884, *M. K. Curran* (US); same locality, July, 1907, *M. Alice King* (UC); same locality, *K. Brandegee* (DS); same locality, near Hog Ranch, July, 1902, *Hall & Babcock* 3306 (G, RM, UC, US); Yosemite Valley, 1868, *J. Torrey* (G, NY, T); same locality, June, 1911, *L. R. Abrams* 4474 (DS, G) and *H. M. Hall* 8870 (DS, G, UC, US); same locality, Royal Arches, June, 1912, *E. A. Babcock* 1074 (RM, UC). Monterey County: Little Sur, May-June, 1901, *J. B. Davy* 7393 (UC); San Antonio school house, May, 1895, *W. R. Dudley* (DS); Tassajara Hot Springs, June, 1901, *A. E. D. Elmer* 3271 (DS, US). Placer County: Auburn, April, 1919, *G. Bankey* (DS); Bear Valley, 1872, *Bolander & Keller* (T); same locality, near Fowler, June, 1894, *Martha Brier* (UC); —, 1893, *Mrs. M. M. Hardy* (T, UC). San Bernardino County: San Bernardino Mountains, Grass Valley, June, 1894, *S. B. Parish* 3111 (G, NY, T, UC). Tulare County: North Fork Kern River, June, 1888, *E. Palmer* 115 (US); Bear Creek, May, 1896, *C. A. Purpus* 1725 (UC); Grape Vine Spring, east of Visalia, March, 1898, *P. S. Woolsey* (UC); Sequoia National Park, July, 1914, *Myrtle Lathrop* (CPS). Tuolumne County: near Cherry River, June, 1889, *Chesnut & Drew* (UC); near Big Oak Flat, May, 1895, *W. C. Blasdale* (UC); Five Mile Creek, May, 1916, *A. L. Grant* (DS); above Rawhide, April, 1919, *R. S. Ferris* 1480 (DS).

## CONCINNI

This group is based upon two closely related forms collected by Douglas in California and described by Agardh from specimens in Lindley's herbarium. A review of this group necessitates accounting for the following names:

- L. concinnus* Agardh, Syn. Gen. Lup. 6. pl. 1, f. 1. 1835.  
*L. gracilis* Agardh, *ibid.* 15. pl. 1, f. 2. 1835.  
*L. Orcuttii* Wats. Proc. Am. Acad. 20: 359. 1885.

- L. pallidus* Brandege, Zoe 4: 203. 1893.  
*L. micensis* Jones, Proc. Cal. Acad. I. 5: 630. 1895.  
*L. desertorum* Heller, Muhlenbergia 2: 72. 1905.  
*L. Agardhianus* Heller, *ibid.* 7: 13. 1911.

Heller has shown that Nuttall's *L. gracilis*, of the Gulf States, has priority over *L. gracilis* Agardh, hence the second name of the above list is properly replaced by the last one given. Agardh very obligingly contrasts his two species on one and the same plate, and careful comparison of his two descriptions discovers no marked differences other than those shown by his drawings. The odd fact is that he classifies *L. concinnus* in his group "B" (*Pilosi*) and his *L. gracilis* in his group "E" (unlettered and unnamed, but plainly provided for in his arrangement).

This group is primarily Californian, ranging from Monterey County to northern Lower California, just two forms having an extensive range into the Mexican Plateau region, as far north as southern Utah, east to southern New Mexico, and south into Sonora.

The pubescence varies from long-villous to subappressed, and the habit from erect and simple to much branched with the lower branches widely spreading. Some of the axillary branches are occasionally reduced to mere racemes, and even more often to one or two axillary flowers, which develop normal pods and seeds: hence the character, "racemes . . . sessile in the axils," ascribed by Watson to his *L. Orcuttii*. The flowers are usually small, 7-9 mm. long, but conspicuously larger in a form of the San Bernardino and the San Jacinto Mountains. The petals vary from white and yellowish to a bright blue or a rich reddish purple, variously designated by authors. Few other characters seem to be marked enough to justify their use in diagnoses, and I must admit that the six forms which I am able to recognize are so closely related to each other that their relationship seems to me to be best expressed by classifying them all as varieties of one species. I cannot appreciate color alone as of sufficient value to warrant specific distinctions, and the variable pubescence here, as in *L. densiflorus*, *L. sparsiflorus*, etc., seems to prohibit positive lines of separation.

**Key to the varieties of *Lupinus concinnus***

- Densely villous with hairs 1-2.5 mm. long; petals more or less reddish purple; banner 6-10 mm. long, 3-9 mm. wide, mostly with rounded or emarginate apex.
- Flowers 6-7 mm. long; banner about 6 mm. long and 3 mm. wide. 2b. var. *Orcuttii*.
- Flowers 7-12 mm. long; banner 4-9 mm. wide.
- Flowers 7-9 mm. long; banner 7-8 mm. long and 4-5 mm. wide. 2a. *L. concinnus*.
- Flowers 10-12 mm. long; banner 9-10 mm. long and 7-9 mm. wide. 2c. var. *optatus*.
- Loosely villous or mostly appressed-pubescent; banner 6-7 mm. long, 3-4 mm. wide, mostly with angled apex.
- Pubescence obviously spreading; petals reddish purple or blue-edged. 2d. var. *Agardhianus*.
- Pubescence mainly appressed; petals white or yellowish.
- Leaflets 5-6, spatulate, obtuse at apex. 2e. var. *pallidus*.
- Leaflets 6-9, oblong-lanceolate, angled at apex. 2f. var. *desertorum*.

2a. *LUPINUS CONCINNUS* Agardh, Syn. Gen. Lup. 6. *pl. 1, f. 1*. 1835. [FIG. 68.]

Simple or much branched from the base, 6-20 cm. tall, densely villous, the spreading hairs 1-3 mm. long; leaves numerous, very villous, the petioles two to four times as long as their longest leaflets, which are five to eight, oblanceolate with obtuse apex, 10-20 mm. long, 2-5 mm. wide; racemes nearly sessile, 3-6 cm.

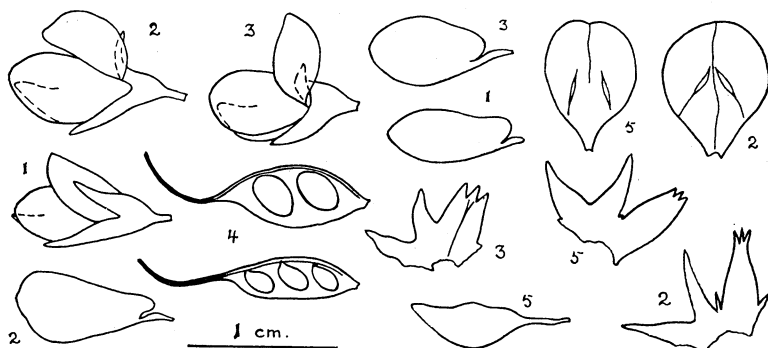


FIG. 68. *LUPINUS CONCINNUS* Agardh. 1. A. D. E. Elmer 3279 (US); 2. L. R. Abrams 3564 (US); 3. E. O. Wootton (US 241176); 4. C. R. Orcutt (US 21071); 5. T. S. Brandegee (US 735428).

long, surpassed by the leaves; flowers 7-9 mm. long, usually well scattered, pedicels about 1 mm. long, stout, densely villous; calyx also densely hairy, upper lip bifid, about 4 mm. long, lower lip three-toothed, somewhat longer; petals edged with rich reddish purple, banner 7-9 mm. long, 4-5 mm. wide, rounded or emarginate at apex, wings 7-8 mm. long, about 3 mm. wide, keel

usually straight, 6–7 mm. long, about 2 mm. wide, naked: pods oblong, 10–15 mm. long, ovules two to four; seeds 2–3 mm. long, angled, nearly square, mostly dull-spotted on a pale ground.

CALIFORNIA. Imperial County: Coyote Wells to Cement Bridge, April, 1917, *E. A. McGregor* 841 (DS); Live Oak Springs, June, 1917, *E. A. McGregor* 907 (DS). Kern County: Bakersfield, April–May, 1896, *J. B. Davy* 1800 (UC); Kernville, May, 1911, *K. Brandegee* (UC); Tehachapi, no date, *K. Brandegee* (DS). Los Angeles County: Antelope Valley, May, 1896, *J. B. Davy* 2321 (UC); same locality, Richardson's Canyon, May, 1896, *J. B. Davy* 2495 (G, UC); Catalina Island, September, 1893, *A. J. McClatchie* (NY); Liebre Mountains, June, 1908, *Abrams & McGregor* 374 (DS); Mount Wilson, May, 1896, *A. J. McClatchie* (NY). Monterey County: Los Burros Mines, April, 1898, *R. A. Plaskett* (G, RM); San Antonio Creek, May, 1895, *W. R. Dudley* (DS); San Antonio River, March, 1920, *C. D. Duncan* 52 (DS); Tassajara Hot Springs, June, 1901, *A. D. E. Elmer* 3279 (DS, US). Riverside County: Cottonwood Mountains, May, 1905, *H. M. Hall* 6022 (B, UC); San Jacinto River, March, 1896, *A. J. McClatchie* 1136 (NY); May, 1904, *H. M. Hall* 4945 (DS). San Bernardino County: Cajon Pass, April, 1902, *H. M. Hall* 3006 (UC); Colton, April, 1882, *M. E. Jones* 3196 (G, NY, US); Ord Mountains, toward Kane Spring, May, 1906, *Hall & Chandler* 6792 (B); San Bernardino, 1880, *W. G. Wright* 9, (G); Santa Ana Canyon, April, 1898, *G. Robertson* (UC); Skyland, June, 1913, *H. P. Chandler* 2 (UC). San Diego County: Campo, May, 1903, *L. R. Abrams* 3564 (DS, G, NY, US); Coyote Canyon, April, 1902, *H. M. Hall* 2820 (UC); Jacumba Hot Springs, May, 1894, *L. Shoemfeldt*, *Int. Bound. Comm.* 3268 (US); Jacumba, April, 1905, *T. S. Brandegee* (US); San Felipe, 1899, *K. Brandegee* (UC); San Jacinto Mountains, June, 1897, *G. F. Reinhardt* (UC); same locality, May, 1897 and 1899, and June, 1901, *H. M. Hall* 547 (US), 1128 (NY), and 2067 (DS); Stonewall, June, 1894, *T. S. Brandegee* (UC); Tia Juana Wash, April, 1903, *H. M. Hall* 3970 (G, UC); 1889, *C. R. Orcutt* (US 40871). Santa Barbara County: near Santa Barbara, 1894, *F. Franceschi* (UC); San Rafael Mountains, 1889, *H. C. Ford* (G.) County not determined: Burnett Creek, April, 1901, *W. R. Dudley* (DS); Erskin Creek,

hillsides, 1897, *C. A. Purpus* 5363 (G, UC, US); no locality or date, *D. Douglas* (T).

LOWER CALIFORNIA. Cantillas Mountains, July, 1884, *C. R. Orcutt* (US); north of Hansen's ranch, April, 1885, *C. R. Orcutt* 1262 (G).

ARIZONA. Mohave County: Peach Spring, April, 1893, *N. C. Wilson* (UC). Pima County: Santa Catalina Mountains, April, 1895, *J. W. Toumey* (NY, UC); Santa Rita Forest, March-April, 1903, *D. Griffiths* 4210 (US). County not determined: Copper Basin, June, 1892, *J. W. Toumey* 574 (US); Lynx Creek, May, 1893, *H. H. Rusby* (US, T); Saginaw Mine Trip, March, 1901, *D. Griffiths* 2492 (NY).

NEW MEXICO. Dona Ana County: Organ Mountains, May, 1892, 1893 and 1900, *E. O. Wooton* (US). Grant County: Mangas Springs, May, 1903, *O. B. Metcalfe* 69 (G, NY, RM, UC, US).

2b. ***Lupinus concinnus* Orcutti** (Wats.) comb. nov. [FIG. 69.]

*Lupinus Orcuttii* Wats. Proc. Am. Acad. 20: 359. 1885.

*Lupinus micensis* Jones, Proc. Cal. Acad. II. 5: 630. 1895.

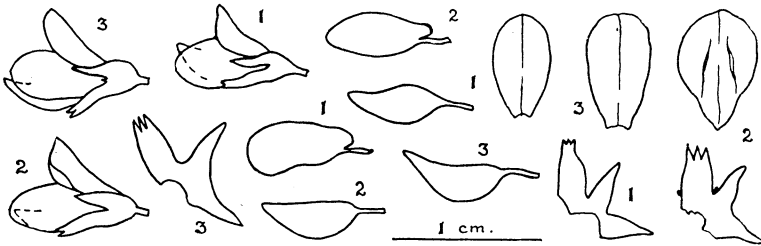


FIG. 69. *LUPINUS CONCINNUS* ORCUTTII (Wats.) C. P. Smith. 1. *M. E. Jones* 5163g (US); 2. *Rose, Standley & Russell* 1508g (US); 3. *E. A. Mearns*, I.B.C. 3482 (US).

Differs from typical *L. concinnus* only in being commonly more congested and with smaller flowers, 6–7 mm. long, banner narrower, about 3 mm. wide.

My determination of Watson's species is based upon the Gray Herbarium sheet of the only collection cited by him, while I have judged Jones's species from his several specimens in the United States National Herbarium. I see no substantial differences between the specimens concerned, and Watson's assignment of his species to the subgenus *Platycarpus* I cannot accept.



CALIFORNIA. Inyo County: Pleasant Canyon, Panamint Mountains, May, 1906, *Hall & Chandler 6955* (UC). Kern County: Caliente, no date, *K. Brandegee* (UC). Monterey County: Santa Lucia Mountains, Burro Trail, June, 1909, *K. Brandegee* (UC). San Bernardino County: Bagdad, May, 1902, *T. S. Brandegee* (UC); Barnwell, May, 1911, *K. Brandegee* (UC); Daggar, no date, *K. Brandegee* (UC); Goffs, March, 1915, *S. B. Parish 9657* (UC); Morongo, Colorado Desert, March, 1882, *S. B. Parish 1270\** (NY); San Bernardino, March, 1915, *S. B. Parish* (UC); Warren's Well, May, *T. S. Brandegee* (UC). San Diego County: Colorado Desert, *C. R. Orcutt* (G); San Felipe, April, 1894, *T. S. Brandegee* (UC). Santa Barbara County: Cuyama, May, 1896, *A. Eastwood* (G); Santa Cruz Island, April, 1888, *T. S. Brandegee* (UC). Tulare County: North Fork Kern River, 1898, *C. A. Purpus* (UC). Ventura County: Ojai, Matilija Canyon, April, 1866, *S. F. Peckham* (US). County not determined: April, 1901, *G. B. Grant 3793* (US).

LOWER CALIFORNIA. Japa, July, 1884, *C. R. Orcutt 1133* (G, NY); Nachoguero Valley, June, 1894, *E. A. Mearns, Int. Bound. Comm. 3482* (US).

SONORA. Magdalena, April, 1910, *Rose, Standley, & Russell 15089* (US); Santa Cruz River Valley, May, *E. K. Smith* (T).

ARIZONA. Cochise County: Benson, April, 1905, *T. E. Wilcox* (US); Fort Huachuca, April, 1892, *T. E. Wilcox* (T, UC); same locality, 1894, *T. E. Wilcox 37* (US). Maricopa County: Camp Lowell, April, 1881, *C. G. Pringle* (NY, T); same locality, May, 1883, *C. G. Pringle* (UC). Mohave County: Yucca, May, 1884, *M. E. Jones 3898* (NY, RM, US). Pima County: Loasa to Lavare via Baboquivari, March–April, 1903, *D. Griffiths 3616* (US); Sabina Canyon, April, 1892, *J. W. Toumey* (DS, UC); Santa Rita Forest, March–April, 1903, *D. Griffiths 3849* (US); Tucson, March, 1877, *E. L. Greene 1066* (G); same locality, March–April, 1903, *D. Griffiths 3533* (US); Tucson Range Reserve, March, 1901, *D. Griffiths 2387* and *2554* (NY). Santa Cruz County: Crittenden, May, 1892, *T. S. Brandegee* (UC); Nogales to Calabasas, April, 1908, *I. Tidestrom 799* (US); Nogales, hills

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\* Two specimens of *L. Shockleyi* and one specimen each of *L. odoratus* and *L. microcarpus ruber* are also mounted on this sheet.

east, March, 1908, *I. Tidestrom* 720 (US). Yavapai County: Prescott, April, 1876, *E. Palmer* (G). County not determined: Agua Verda Creek, March, 1914, *J. A. Harris* C1489 (US); Oracle to Redington, March–April, 1903, *D. Griffith* 3731 (US); Pagumpa, April, 1894, *M. E. Jones* 5095b (US); 1869, *E. Palmer* (US 20944, lower specimen only); 1876, *E. Palmer* 83 (US 21025).

NEW MEXICO. Luna County: Florida Mountains, March, 1897, *C. L. Herrick* 323 (US).

UTAH. Washington County: Silver Reef, May, 1894, *M. E. Jones* 5149h, 5163g, 5176j (US); St. George, 1877, *E. Palmer* 87 (G, T, US); same locality, 1919, *I. Tidestrom* 9260 (US, CPS).

NEVADA. Clark County: Mica Spring, April, 1894, *M. E. Jones* 5045f and 5072b (US). Nye County: Rhyolite, May, 1909. *A. A. Heller* 9681 (B).

2c. ***Lupinus concinnus optatus*** var. nov. [FIG. 70.]

A *L. concinni* differt altitudine 20–30 cm.; floribus 10–12 mm. longis, vexillo 9–10 mm. longo, 7–9 mm. lato, apice emarginato, alis 10 x 6 mm., carina 9 mm. longa.

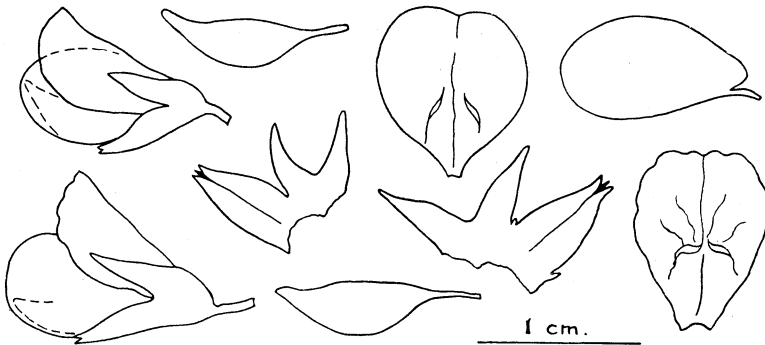


FIG. 70. *LUPINUS CONCINNUS OPTATUS* C. P. Smith. *S. B. Parish* 3055 (US).

Differs from the typical plant in being taller and more robust throughout; flowers 10–12 mm. long, banner 9–10 mm. long, 7–9 mm. wide, mostly emarginate at apex, wings 10 x 6 mm. and keel 9 mm. long.

Presumably a mountain-valley form inhabiting areas of greater rainfall or abundant seepage.

CALIFORNIA. Monterey County: Santa Lucia Mountains, Plaskett Trail, May, 1897, *A. Eastwood* (G, G). Riverside County: Banning, *M. F. Gilman* 5 (UC); Fairmount Park, May,

1904, *H. M. Hall* 4945 (B, UC); same locality, May, 1907, *F. M. Reed* 1332 (B); San Jacinto, 1890, *Mrs. Gregory* (UC). San Bernardino County: Colorado Desert, April, 1889, *C. R. Orcutt* (US); San Bernardino, June, 1876, *J. G. Lemmon* (DS); San Bernardino Mountains, May, *Clara E. Cummings* (G); same locality, May, 1880, *G. R. Vasey* 95 (US); same locality, June, 1888, *S. B. Parish* (UC); same locality, Fredalba, July, 1908, *H. M. Hall* 8942 (NY, US); same locality, Grass Valley, June, 1894, *S. B. Parish* 3055 (TYPE, US 214651); same locality, Hunsacker Flat, June, 1916, *H. P. Chandler* 9 (UC); same locality, south slope, March, 1906, *S. B. Parish* 5761 (B, RM); Mojave River headwaters, May, 1881, *S. B. & W. F. Parish* 94 (T); Victorville, April, 1919, *P. A. Munz* 2590 (DS). San Diego County: Cuyamaca, July, 1906, *K. Brandegee* (UC); Descanso, May, 1906, *T. S. Brandegee* (NY, UC); Jacumba, April, 1905, *T. S. Brandegee* (UC); Santa Ysabel, April, 1893, *H. W. Henshaw* 140 (US); Warner's ranch, May, 1899, *H. M. Hall* 1373 (UC); Witch Creek, May, 1894, *R. D. Alderson* (UC). County not determined: San Emigdio Canyon, May, 1896, *J. B. Davy* 2061 (UC); 1876, *Parry & Lemmon* 64 (G, T); *Dr. Coulter* (T); *H. P. Chandler* 1498 (UC); *S. B. Parish* (US 136782); 1889, *C. R. Orcutt* (US 40870, left-hand specimen only).

2d. ***Lupinus concinnus* Agardhianus** (Heller) comb. nov. [FIG. 71.]

*Lupinus gracilis* Agardh, Syn. Gen. Lup. 15. pl. 1, f. 2. 1835.

*Lupinus Agardhianus* Heller, *Muhlenbergia* 7: 13. 1911.

Differs from the typical *L. concinnus* in being usually more slender, less branched, and of open habit; petals edged with rose-purple or sometimes bright blue; pubescence spreading, but much less dense; banner usually acute at apex.

Agardh's plate and description seem to abundantly warrant the usual determinations here accepted by me.

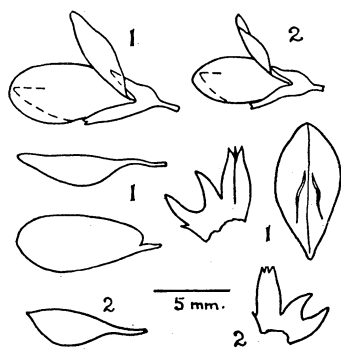


FIG. 71. *LUPINUS CONCINNUS* AGARDHIANUS (Heller) C. P. Smith. 1. *H. M. Hall* 3862 (US); 2. *C. R. Orcutt* (US 40870, right hand specimen)

CALIFORNIA. Kern County: Fort Tejon and vicinity, 1857–58, *L. J. Xantus de Vesey* (G). Los Angeles County: Avalon, Santa Catalina Island, May, 1897, *B. Trask* (US); Manzana, Antelope Valley, May, 1896, *J. B. Davy 2499* (UC); San Fernando Mountains near Chatsworth Peak, April, 1901, *L. R. Abrams 1365* (DS, G, NY). Monterey County: near Monterey, 1850, *Rev. S. H. Willey* (G); Carmel-by-the-Sea, April, 1910, *A. D. Randall* (DS). San Bernardino County: Cajon Pass, April, 1881, *C. G. Pringle 36* (G); same locality, April, 1902, *H. M. Hall 3005* (B, G, UC); May, 1903, *M. E. Jones* (UC); Mojave Desert, near Cajon Pass, May, 1914, *S. B. Parish 9255* (NY); San Bernardino, May, 1880, *G. R. Vasey* (US). San Diego County: Banner, April, 1899, *K. Brandegee* (UC); Campo, May, 1903, *L. R. Abrams 3566* (DS, G, NY, UC, US); Carriso Creek, April, 1893, *T. S. Brandegee* (UC); Coyote Canyon, April, 1902, *H. M. Hall 2821* (UC); Dulzura, 1903, *Mr. Valentine* (UC); La Jolla, March, 1914, *F. E. & E. S. Clements 150* (G); Point Loma, March, 1895, *T. S. Brandegee* (UC); Poway, April, 1903, *H. M. Hall 3862* (B, G, US); San Diego, April, 1902, *G. B. Grant 1404* (UC, US); same locality, April, 1906, *K. Brandegee* (B, UC); same, May, 1906, *T. S. Brandegee* (B, NY); southwestern Colorado Desert, April, 1889, *C. R. Orcutt* (G, US 40870, right-hand specimen only); Witch Creek, April, 1894, *R. D. Alderson* (UC). San Luis Obispo County: Estrella (received Feb. 22, 1897), *L. Jared* (UC); San Luis Obispo district, June, 1876, *E. Palmer 95* (UC). Santa Barbara County: Aloma Creek, *C. Cox* (UC); Santa Barbara, *S. F. Peckham* (NY). Ventura County: Ojai Valley, April, 1896, *F. W. Hubby 38* (UC).

LOWER CALIFORNIA. San Quentin Bay, Feb., 1889, *E. Palmer 708* (US).

2e. ***Lupinus concinnus pallidus*** (Brandegee) comb. nov. [FIG. 72.]

*Lupinus pallidus* Brandegee, *Zoe* 4: 203. 1893.

Differs from var. *Agardhianus* in having the pubescence mainly appressed, though with some spreading hairs; petals usually white or pale bluish; leaflets five or six, spatulate, rounded at apex: seeds "white marbled with black" or light tan spotted with darker tan.

CALIFORNIA. San Diego County: Mountain Springs, April, 1889, *C. R. Orcutt* (US) ; same locality, May, 1894, *L. Schoemfeldt*, *Int. Bound. Comm.* 3065 (US); San Diego, May, 1906, *T. S. Brandegee* (B); San Filipe, April, 1895, *T. S. Brandegee* (UC); Sea Beach, April, 1882, *C. G. Pringle* (T, US); Tia Juana, May, 1903, *L. R. Abrams* 3487 (DS, NY).

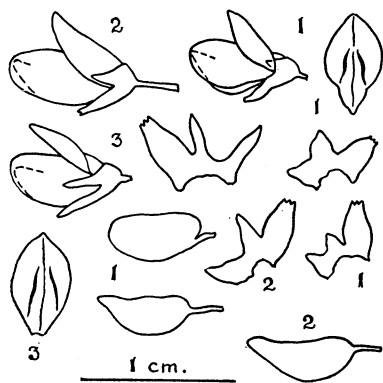


FIG. 72. *LUPINUS CONCINNUS PALLIDUS* (Brandegee) C. P. Smith. 1. *C. R. Orcutt* 1326 (US); 2. *C. R. Orcutt* (US 21035); 3. *L. Schoemfeldt*, *I.B.C.* 3065 (US)

LOWER CALIFORNIA. San Vincente, June, 1893, *T. S. Brandegee* (US); northern Lower California, April, 1886, *C. R. Orcutt* 1326 (T, US).

2f. *Lupinus concinnus desertorum* (Heller) comb. nov. [FIG. 73.]

*Lupinus desertorum* Heller, *Muhlenbergia* 2: 72. 1905.

Differs from var. *pallidus* in the number and shape of the leaflets which are six to nine, oblong-lanceolate, angled at apex.

CALIFORNIA. Kern County: Randsburg, April, 1905, *A. A. Heller* 7679 (B, DS, UC, US). San Bernardino County: Ord Mountains, May, 1906, *Hall & Chandler* 6792 in part\* (B, UC).

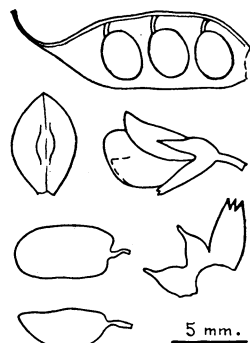


FIG. 73. *LUPINUS CONCINNUS DESERTORUM* (Heller) C. P. Smith. *A. A. Heller*.

SUBCARNOSI

3. *LUPINUS SUBCARNOSUS* Hook. *Bot. Mag.* 10: pl. 3467. 1836. [FIG. 74.]

*Lupinus texensis* Hook. *Ibid.* 10: pl. 3492. 1836.

*Lupinus bimaculatus* Hook.; Don, *Sweet's Brit. Fl. Gard.* II. 4: pl. 314. 1838.

\* The other specimen on this sheet is cited as typical *L. concinnus*.

*Lupinus subramosus* Hort.; Vilm. Fl. Pl. Terre 1: 479. 1865.

*Lupinus leonensis* Wats. Proc. Am. Acad. 17: 338. 1882.

Annual, biennial, or perhaps sometimes perennial, mostly branched at the base, the branches more or less decumbent, the whole plant 1.5–4 dm. tall, subappressed-silky pubescent, often with some spreading hairs; leaves several, very silky below and on the margins, glabrous or nearly so above, petioles fully twice as long as their longest leaflets, leaflets usually five only, oblanceolate, apex acute or obtuse, the lower leaves sometimes with more fleshy obovate leaflets, 12–25 mm. long, 6–12 mm. wide; peduncles 3–8 cm. long, racemes 6–12 cm. long, several-flowered; bracts 5–6 mm. long, lanceolate, deciduous; flowers 10–13 mm. long, spreading, approximate, non-verticillate, pedicels 3–6 mm. long; calyx bracteolate, the bractlets often over 2 mm. long and 1 mm. wide, upper lid bifid, 4–5 mm. long, lower lip entire or acutely three-toothed, about 6 mm. long; petals broad, bright blue, the banner with a white center which may turn purplish with age, suborbicu-

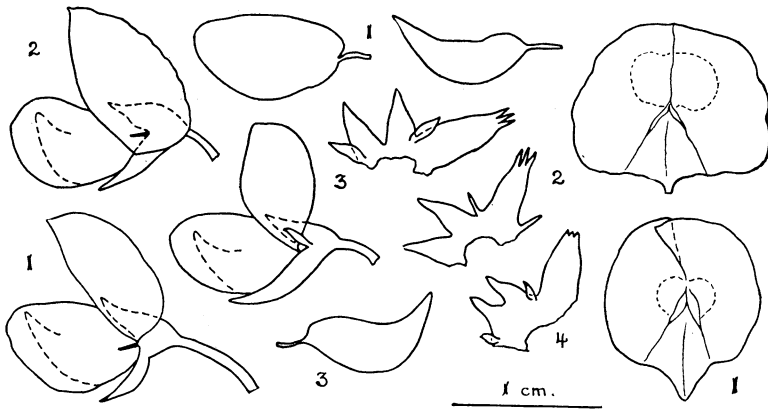


FIG. 74. LUPINUS SUBCARNOSUS Hook. 1. *F. L. Lewton* 75 (US); 2. *A. Ruth* 344 (US); 3. *E. Palmer* 198 (G); 4. *C. G. Pringle* 8297 (US).

lar, 11–13 mm. long, 9–13 mm. wide, wings 10–11 mm. long, 6–7 mm. wide, keel non-ciliate, the usually slender point sharply upturned; pods silky, 25–35 mm. long, 6–8 mm. broad, stout and somewhat constricted between the large seeds, ovules four or five; seeds gray or tawny, unmarked or obscurely spotted, about 5 mm. long by 4 mm. wide, the hilum deeply sunken in a conspicuously projecting ring.

This is another variable species, the extremes examined by Hooker appealing to him as distinct forms, although he must

have hesitated about publishing his third name. It was my earlier intention to account for these forms and maintain their names in a varietal classification; but when I carefully considered the array of specimens listed below, I was forced to the conclusion that the distinctions emphasized are not constant enough to permit such a treatment. *L. bimaculatus*, although said to be a perennial, and *L. subramosus*, although credited with leaflets oval and seven to nine in number, need to be checked up carefully before being recognized as good varieties; while the Gray Herbarium specimen of the type collection of *L. leonensis* does not permit me to separate same from the common *L. texensis* extreme. Extracts from the five descriptions follow:

*L. subcarnosus*. Herbaceus annuus, caule pubescenti-sericeo, foliolis quinis obovato-lanceolatis subcarnosis supra glaberrimis subtus (margineque praecipue) sericeis, stipulis elongato-subulatis, racemo pyramidalis, pedicellis alternis longitudine florum, calycibus sericeis bibractiatis, labio superiore brevior bifido inferiore lanceolato apice tridentato dento intermedio longiore, vexillo orbiculari intense caeruleo medio macula alba plica longitudinali divisa.

A . . . very distinct species . . . specimens . . . in my Herbarium . . . were collected at Bejar in Texas, by M. Berendier in 1828. It has been again gathered . . . by Mr. Drummond, between Brazoria and San Felipe . . . Seeds arrived in England from the last mentioned Naturalist, and have produced their handsome flowers in July of the present year, 1835. . . . keel white, much acuminate, purple-black at the tip. Legumes, in my native specimens, an inch and a half in length. linear-oblong, compressed. . . . 4 or 5 seeds . . . silky.

Hooker's second species is described with almost exactly the same words as the first; hence only the differences indicated are quoted here:

*L. texensis*. . . . foliolis . . . lanceolatis acutiusculis . . . stipulis subulatis . . . calycibus . . . bilabiatis utrinque bractea parva . . . inferiore acuminato integerrimo . . .

Much and closely as this plant resembles the *Lupinus subcarnosus* . . . it nevertheless appears to me to be really distinct. The habit is stouter, the leaves are by no means fleshy, nor are their leaflets retuse, but acute. . . . The lower lip of the calyx I find to be always entire . . . the former [*L. subcarnosus*] is found near the coast, the latter at San Felipe in the Interior. . . . The chief distinction is, however, certainly to be looked for in the foliage.

*Lupinus bimaculatus*. Hooker Mss. Root perennial. Stems . . . with adpressed silky hairs. . . . Leaves . . . quinate, leaflets oblong-spathulate . . . silky beneath, glabrous and pale green above, 1½ inches long. . . . Calyx silky, . . . appendiculate; upper-lip cloven . . . lower . . . ovate-lanceolate, acute, entire, keele . . . Vex. orbicular, slightly emarginate, blue, marked in the centre with a large pale, yellow spot which . . . changes to a dull red. . . . keel glabrous and white, with a dark blue elongated pointed incurved apex. Pod cylindrical, copiously silky, about an inch long, and having 3-5 seeds.

A very pretty perennial Lupine from Texas, a province of the Mexican republic, where it was discovered by the late Mr. Thos. Drummond, and introduced to our gardens from seed. . . .

*L. subramosus*. Texas. Annuel. Plante couverte de poils soyeux, mous et argentés. Tiges rameuses, dressées, hautes de 40 cent. environ. . . . folioles ovales

7-9, obscurement mucronulées . . . étendard d'un beau bleu, marqué d'une tache purpurine au centre ailes également bleues; carène blanche, à sommet bleu foncé. Dans les jeunes ours, la tache de la carène est jaune paille pointillé de rouge. Graine petite, à peu près carrée, à angles arrondis, à ombilic saillant sur l'un des coins . . .

*L. leonensis*. Biennial (?), branching at the base and the leafy stems decumbent (6 to 12 inches high), coarsely villous throughout, the hairs appressed or somewhat spreading . . . leaflet 5, oblanceolate, acute, very silky below and on the margins, glabrous or nearly so above, 6 to 10 lines long or less . . . flowers blue, 5 lines long, scattered . . . calyx tube turbinate . . . pods linear, 4-6-seeded, 12-15 lines long by 3 broad.

At Guajuco, Nuevo Leon (198). [E. Palmer.]

The above quotations will probably convince any student that the five names concerned belong to very closely related forms. Watson (Bib. Index 241. 1878) recognized the identity of Hooker's three species but seems to have forgotten these variations when he came to treat Palmer's collections from Northern Mexico. Hemsley (Biol. Cent. Amer. 1: 229. 1880) records *L. bimaculatus* from "Toluca, in alpine meadows, 12000 feet." As this is in the State of Mexico, it might well be expected that this will prove to be a distinct variety if not a separate species.

TEXAS. Austin County: Industry, 1893, *H. Wurzlow* 18 (US), Bexar County: San Antonio, April, 1853, *G. Thurber* (G); same locality, March, 1881, *V. Havard* 176 (G); same locality, *G. Jermy* (US); same locality, Alamo Heights, May, 1900, *R. N. Larrabee* (US). Blanco County: Cypress, 1905, *Mrs. M. Snyder* (UC). Comal County: Bracken, July, 1903, *B. H. A. Groth* 219 (G). Comanche County: Comanche Spring, New Braunfels, etc., March, 1850, *F. Lindheimer* 771 (G, NY, UC, US). Dallas County: Dallas, May, 1879, and April, 1880, *J. Reverchon* (G, UC, US); same locality, April, 1900, *B. F. Bush* 585 (G, US). Dewitt County: Cuero, March, 1907, *A. H. Howell* 300 (US). Gillespie County: Crab Apple, *G. Jermy* 257 (US); Otto Mountain, *G. Jermy* 256 (US). Harris County: Harrisburg, May, 1876, *J. F. Joor* 58 (US). Kinney County: Fort Clark, March, 1893, *E. A. Mearns*, *Int. Bound. Comm.* 1301 (DS, G, UC, US). Lavaca County: Hallettsville, April, 1913, *J. Davis* (US); same, *A. E. Townsend* (US). Nueces County: Corpus Cristi Bay, March, 1894, *A. A. Heller* 1466 (G, RM, UC, US); Corpus Cristi, April, 1905, *S. M. Tracy* 9080 (G, NY, US); Nuecestown, April, 1896, *C. L. Marlatt* (US). Tom Green County: Dove Creek, May, 1880,



*F. Tweedy* 59 (US). Torrent County: Polytechnic, *A. Ruth* 344 (US). Travis County: Austin, March, 1890, *J. E. Bodin* 90 (US). Victoria County: Victoria, March, 1905, *F. L. Lewton* 75 (US); same, April, 1907, *A. H. Howell* 348 (US). Waller County: Hempstead, April, 1872, *E. Hall* 159 (NY, US). County not determined: Rio Grande Prairies, 1844, *E. Meyer* (T); 1847-1848, *F. Lindheimer* 600 (G, US); *C. Wright* (G, G); 1879, *J. Reverchon* (G); sheets 375 and 1555 from Berlander's herbarium (G); *A. M. Hildebrand* (US); *T. Drummond* (T, T); 1856, *Dr. Swift* (US).

NUEVO LEON. Guajuco, twenty-five miles southeast of Monterey, March, 1880, *E. Palmer* 198 (G); Monterey foothills, March-April, 1906, *C. G. Pringle* 10163 (G, NY, US); Monterey fields, March, 1891, *C. K. Dodge* 43 (US).

COAHUILA. Diaz, April, 1900, *C. G. Pringle* 8297 (G, RM, UC, US).

The abbreviations herein used in the citation of specimens may be identified by reference to the following list:

- B, Brooklyn Botanic Garden;
- CPS, private herbarium of the writer;
- DS, Dudley Herbarium of Stanford University;
- G, Gray Herbarium of Harvard University;
- NY, New York Botanical Garden;
- RM, Rocky Mountain Herbarium, University of Wyoming;
- T, Torrey Herbarium (at New York Botanical Garden);
- UC, University of California;
- US, United States National Herbarium.

My thanks are most cordially extended to the various friends who have so kindly assisted in this work by making it possible for me to examine the many specimens cited in the present paper and also those cited in the fourth and fifth papers of this series.